

U.S. Patent Application Serial No. 09/905,052
Attorney Docket No. 03310.018001; 01-3001

IN THE CLAIMS

Please amend the claims as follows:

1. (Withdrawn) An etching solution suitable for etching a resin layer based on a polyimide, the solution comprising:

3 to 65% by weight alcohol;

10 to 55% by weight alkaline compound; and

0.75 to 3.0 times the weight of the alkali compound water, wherein the alcohol comprises at least one alcohol selected from the group consisting of a diol containing from 3 to 6 carbon atoms and a triol containing from 4 to 6 carbon atoms and wherein the alkali compound comprises at least one selected from the group consisting of an alkali metal hydroxide and a quaternary ammonium hydroxide.

2. (Withdrawn) An etching solution suitable for etching a resin layer based on a polyimide, the solution comprising:

3 to 65% by weight alcohol;

10 to 55% by weight alkaline compound; and

0.85 to 2.5 times the weight of the alkali compound water, wherein the alcohol comprises at least one selected from the group consisting of a diol containing from 3 to 6 carbon atoms and a triol containing from 4 to 6 carbon atoms and wherein the alkali compound comprises at least one selected from the group consisting of an

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alkali metal hydroxide and a quaternary ammonium hydroxide.

3. (Withdrawn) The etching solution of claim 1, wherein the alkali metal hydroxide comprises at least one compound selected from a group consisting of sodium hydroxide, potassium hydroxide and lithium hydroxide.
4. (Withdrawn) The etching solution of claim 2, wherein the alkali metal hydroxide comprises at least one compound selected from a group consisting of sodium hydroxide, potassium hydroxide and lithium hydroxide.
5. (Withdrawn) The etching solution of claim 1, wherein the quaternary ammonium hydroxide comprises at least one selected from the group consisting of tetramethylammonium hydroxide and tetraethylammonium hydroxide.
6. (Withdrawn) The etching solution of claim 2, wherein the quaternary ammonium hydroxide comprises at least one selected from the group consisting of tetramethylammonium hydroxide and tetraethylammonium hydroxide.
7. (Withdrawn) The etching solution of claim 1, wherein the diol comprises at least one diol selected from a group consisting of 1,3-propanediol, 2,3-butanediol, 1,4-butanediol and 1,5-pentanediol.
8. (Withdrawn) The etching solution of claim 2, wherein the diol comprises at least

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one diol selected from a group consisting of 1,3-propanediol, 2,3-butanediol, 1,4-butanediol and 1,5-pentanediol.

9. (Currently Amended) A method for etching a resin layer, comprising:

forming a film-like resin layer based on a polyimide having an imidation degree of from 50 to 98 %;

providing a resist layer having an opening at a position on a surface of the resin layer; and

bringing an etching solution at 65 °C or more into contact with the resin layer located at a bottom of the opening to etch the resin layer, wherein the etching solution comprises 3 to 65% by weight alcohol, 10 to 55% by weight alkali compound, and water in a weight of 0.75 to 3.0 times a weight of the alkali compound, and wherein the alcohol comprises at least one selected from the group consisting of a diol containing from 3 to 6 carbon atoms and a triol containing from 4 to 6 carbon atoms, and wherein the alkali compound comprises at least one selected from the group consisting of an alkali metal hydroxide and a quaternary ammonium hydroxide,

wherein the etching solution does not comprise an amine compound.

10. (Currently Amended) A method for etching a resin layer, comprising:

forming a film-like resin layer based on a polyimide having an imidation

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degree of from 50 to 98 %;

providing a resist layer having an opening at a position on the surface of the resin layer; and

bringing an etching solution at 65 °C or more into contact with the resin layer located at a bottom of the opening to etch the resin layer, wherein the etching solution comprises 3 to 65% by weight alcohol, 10 to 55% by weight alkali compound, and water in a weight of from 0.85 to 2.5 times the weight of the alkali compound and wherein the alcohol comprises at least one selected from the group consisting of a diol containing from 3 to 6 carbon atoms and a triol containing from 4 to 6 carbon atoms and wherein the alkali compound comprises at least one selected from the group consisting of an alkali metal hydroxide and a quaternary ammonium hydroxide,

wherein the etching solution does not comprise an amine compound.

11. (Original) The method of claim 9, wherein forming a film-like resin layer comprises heating a precursor layer based on a polyimide resin having an imidation degree of less than 50 %.
12. (Original) The method of claim 10, wherein forming a film-like resin layer comprises heating a precursor layer based on a polyimide resin having an imidation degree of less than 50 %.

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13. (Previously Presented) The method of claim 9 wherein forming a film-like resin layer comprises:
- applying a coating solution; and
 - drying the coating solution containing a polyimide having an imidation degree of from 50 to 98 % on a substrate.
14. (Previously Presented) The method of claim 10, wherein forming a film-like resin layer comprises:
- applying a coating solution; and
 - drying the coating solution containing a polyimide having an imidation degree of from 50 to 98 % on a substrate.
15. (Currently Amended) A method for manufacturing a flexible wiring board comprising:
- applying a coating solution containing a polyimide precursor on a side of a substrate having at least a metal wiring on which the metal wiring is provided;
 - drying the coating solution to form a precursor layer based on a polyimide having an imidation degree of less than 50 %;
 - heating the precursor layer to form a polyimide resin layer having an imidation degree of from 50 to 98 %;
 - applying a resist layer coating solution on a surface of the resin layer;

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drying the resist layer coating solution to form a resist layer;
patterning the resist layer in a shape to form an opening;
preparing an etching solution comprising 3 to 65% by weight alcohol, 10 to 55% by weight alkali compound, and water in a weight of from 0.75 to 3.0 times a weight of the alkali compound and wherein the alcohol comprises at least one selected from the group consisting of a diol containing from 3 to 6 carbon atoms and a triol containing from 4 to 6 carbon atoms and wherein the alkali compound comprises at least one selected from the group consisting of an alkali metal hydroxide and a quaternary ammonium hydroxide; and
bringing the etching solution at 65 °C or more into contact with the resin layer located at a bottom of the opening to etch the resin layer,
wherein the etching solution does not comprise an amine compound.

16. (Currently Amended) A method for manufacturing a flexible wiring board comprising:

applying a coating solution containing a polyimide precursor on a surface of a metal foil;
drying the coating solution to form a precursor layer based on a polyimide having an imidation degree of less than 50 %;
heating the precursor layer to form a polyimide resin layer having an imidation degree of from 50 to 98 %;
applying a resist layer coating solution on the surface of the resin layer;

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drying the resist layer coating solution to form a resist layer;
patterning the resist layer in a shape to form an opening;
preparing an etching solution comprising 3 to 65% by weight alcohol, 10 to 55% by weight alkali compound, and water in a weight of from 0.75 to 3.0 times the weight of the alkali compound, and wherein the alcohol comprises at least one selected from the group consisting of a diol containing from 3 to 6 carbon atoms and a triol containing from 4 to 6 carbon atoms and wherein the alkali compound comprises at least one selected from the group consisting of an alkali metal hydroxide and a quaternary ammonium hydroxide;
bringing the etching solution at 65 °C or more into contact with the resin layer located at a bottom of the opening to etch the resin layer;
and providing a resist layer having an opening at a position on the opposite side to a side of the metal foil on which the resin layer is formed to remove the metal foil exposed at the bottom of the opening in the resist layer,
wherein the etching solution does not comprise an amine compound.

17. (Currently Amended) A method for manufacturing a flexible wiring board comprising:

applying a coating solution containing a polyimide having an imidation degree of from 50 to 98 % on the side of a substrate having at least

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a metal wiring on which the metal wiring is provided;
drying the coating solution to form a resin layer;
applying a resist layer coating solution on a surface of the resin layer;
drying the resist layer coating solution to form a resist layer;
patterning the resist layer in a shape to form an opening;
preparing an etching solution comprising 3 to 65% by weight of alcohol,
10 to 55% by weight of alkali compound, and water in a weight of
from 0.75 to 3.0 times a weight of the alkali compound, wherein
the alcohol comprises at least one selected from the group
consisting of a diol containing from 3 to 6 carbon atoms and a triol
containing from 4 to 6 carbon atoms and wherein the alkali
compound comprises at least one selected from the group
consisting of an alkali metal hydroxide and a quaternary
ammonium hydroxide; and
bringing the etching solution at 65 °C or more into contact with the resin
layer located at a bottom of the opening to etch the resin layer,
wherein the etching solution does not comprise an amine compound.

18. (Currently Amended) A method for manufacturing a flexible wiring board comprising:

applying a coating solution containing a polyimide having an imidation
degree of from 50 to 98 % on a surface of a metal foil;
drying the coating solution to form a resin layer;

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applying a resist layer coating solution on a surface of the resin layer;
drying the resist layer coating to form a resist layer;
patterning the resist layer in a shape to form an opening;
preparing an etching solution comprising 3 to 65% by weight alcohol, 10 to 55% by weight alkali compound, and water in a weight of from 0.75 to 3.0 times a weight of the alkali compound wherein the alcohol comprises at least one selected from the group consisting of a diol containing from 3 to 6 carbon atoms and a triol containing from 4 to 6 carbon atoms and wherein the alkali compound comprises at least one selected from the group consisting of an alkali metal hydroxide and a quaternary ammonium hydroxide;
bringing the etching solution at 65 °C or more into contact with the resin layer located at the bottom of the opening to etch the resin layer;
and
providing a resist layer having an opening at a position on the opposite side to a side of the metal foil on which the resin layer is formed to remove the metal foil exposed at a bottom of the opening in the resist layer,
wherein the etching solution does not comprise an amine compound.

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